

THE COLLYBIAS OF NORTH CAROLINA

BY W. C. COKER AND H. C. BEARDSLEE

PLATES 1 AND 4-23

Cap slightly fleshy and in most species drooping soon after maturity, often thin, expanded or rounded at maturity; margin even, at first incurved. Gills sinuate, adnate, adnexed, or free. Stem hollow or stuffed, cartilaginous, rooting. Spores white when fresh, smooth, in most species small. Volva and veil lacking. None is known to be poisonous and all the best known larger ones are valued edibles.

The Genus *Collybia* will be found fairly easy to distinguish among the white spored agarics. It is a little difficult to understand at first what is meant by "cartilaginous stem," and as is usual, some species referred to this genus are not clearly typical and might easily be referred to other genera. These will trouble the beginner. The largest of the genus, *C. platyphylla*, for example, has a thick fleshy stem and may well be looked for in *Tricholoma*. *Collybia confluens*, *C. stipitaria* and *C. zonata* might easily be referred to *Marasmius* at the start and they have in fact been transferred to that genus by some authors (see Atkinson, in N. Y. State Mus. Bull. 205-206: 61. 1919). Kauffman, in his *Agaricaceae of Michigan*, retains them in *Collybia*.

The key which has been arranged has purposely been made as simple as possible, and will, it is hoped, be found practical. It covers the common species of the state, though more will probably be found as our fungous flora is better known. One species which is common in northern woods may be looked for in the mountains. It is *Collybia succosa* Pk. (*C. nigrescens* Quél., *C. atramentosa* Kalch., and *C. fuliginaria* Weinm.). It will be at once recognized from the watery drops which exude from the lamellae when cut and from the black hues which the flesh assumes when injured. *Collybia tenacella* (Pers.) Quél., *C. ventricosa* and *C. clavus* (L.) Quél., were reported from this state by Schweinitz or by Curtis. They are noted as doubtfully American by Murrill (N. Am. Flora 9: 374-6. 1916). *Collybia detersibilis* B. & C., also reported by Curtis, is probably the same as *Clitocybe compressipes* Pk.

It will be noted that two species have been referred to European species not before reported from America. It may be said that this

has been done only after careful comparisons and correspondence with the best European authorities.

Unless otherwise stated all numbered collections are from Chapel Hill, N. C.

IMPORTANT AMERICAN LITERATURE:

- PECK. N. Y. St. Cab. Rept. **23**: 78. 1872. Bot. ed.; also N. Y. St. Mus. Rept. **49**: 32. 1896. Bot. ed.
 MURRILL. N. Am. Flora **9**: 352. 1916 (as *Gymnopus*); and **9**: 287. 1915 (as *crinipellis*).
 LLOYD. *Collybias of Cincinnati*. Mycological Notes No. 5. Dec., 1900.
 KAUFFMAN, C. H. *Collybia*. Mich. Geol. and Biol. Survey Publication, Biological Series **5**. 1918; also *Agaricaceae of Michigan*, p. 749. 1918.
 MORGAN. Journ. Cincinnati Soc. Nat. Hist. **6**: 70. 1883.

Besides the well known works of the older mycologists see the recent important monograph by Sartory and Maire, *Synopsis du genre Collybia*, Paris, 1918. Also see Ricken, *Die Blatterpilze* **2**: 400, pls. 106-9. 1915; Lange, *Studies in the Agarics of Denmark--III*. Dansk Bot. Ark. **2**, No. 7: 10, 3 pls. 1917.

KEY TO THE SPECIES

- Stem stout, striate, in a few cases stuffed, not velvety..... 1
 Stem more slender, glabrous or pruinose, not distinctly striate or velvety..... 5
 Stem distinctly velvety..... 11
 1. Cap white or nearly so..... *C. maculata* (1)
 1. Cap red or chestnut brown, or reddish ochraceous..... 2
 1. Cap gray, grayish brown or olive..... 3
 2. Gills pure white; stem stout and enlarging downwards..... *C. butyracea* (2)
 2. Gills pure white; stem not stout and nearly equal..... *C. dryophila* (3)
 2. Gills spotted with red..... *C. distorta* (7)
 3. Cap viscid; stem with a long root..... *C. radicata* (8)
 3. Cap not viscid..... 4
 4. Gills blackening when injured..... *C. semitalis* (9)
 4. Gills not blackening when injured..... *C. platyphylla* (10)
 5. Growing on decaying fungi, small, buffy tan..... *C. cirrata* (12)
 5. Growing on pine cones, small, threads at base white..... *C. conigena* (13)
 5. Growing on magnolia cones, threads at base buff:..... *C. conigenoides* (14)
 5. Growing on thick beds of moss, small, brown..... *C. clusilis* (22)
 5. Not growing on cones or fungi..... 6
 6. Cap less than 12 mm. broad; plant white all over..... *C. alba* (15)
 6. Cap larger; plant not pure white..... 7
 7. Gills white or nearly so..... 8
 7. Gills distinctly yellow..... *C. exsculpta* (11)
 7. Gills buff color, no tint of lilac..... *C. exsculpta* (a form) (11a)
 7. Gills brownish-lilac, or tan with tints of brownish-lilac..... 9
 8. Growing on damp earth; plant small, the stem base with a mat of tawny

PLATE 4



COLLYBIA MACULATA. No. 1298.

- hairs, color of cap dark brown.....*C. Earleae* (4)
8. Growing on earth, leaves or wood.....10
9. Growing on logs; gills crowded.....*C. myriadophylla* (6)
9. Growing on earth; gills not crowded and with spiny cystidia...*C. lilacina* (21)
10. Usually on leaves; cap center often rugose and always rugose on drying, color yellowish tan with center reddish; spores pip-shaped, about 3.5 - 4.5 x 6 - 9 μ*C. nummularia* (5)
10. On earth, wood or leaves; cap center smooth and usually drying smooth; color pinkish tan or yellowish brown, the center darker; spores elliptic, about 3-3.8 x 5-7 μ*C. dryophila* (3)
11. Cap distinctly viscid.....*C. velutipes* (16)
11. Cap rough-pubescent or squamulose.....12
11. Not as above.....13
12. Cap gray or brownish-gray, not zonate.....*C. stipitaria* (20)
12. Cap rich tawny color, zonate.....*C. zonata* (19)
13. Cap hygrophaneous.....*C. confluens* (18)
13. Cap not hygrophaneous.....*C. hariolorum* (17)

1. *Collybia maculata* A. & S.

PLATES 4 AND 23

Cap up to 8.5 cm. wide, usually 4-6 cm., convex, slightly viscid, smooth, even, dull or faintly shining, not at all striate, color nearly white or a light flesh-pink with darker areas and stains of pinkish-brick color which seem to be the result of rubbing. Center usually not darker than the margin. Flesh white or slightly pinkish, 1 cm. thick in center, thinner towards margin, dense and pliable, odor decidedly woody, taste bitterish and distinctly astringent, sometimes tardily so.

Gills colored like the cap and staining pinkish-brick on bruising; crowded, sinuate attached, narrow, 2-3.5 mm. deep, many short ones, none branched, margin eroded.

Stem 5-10 cm. long usually rather deeply rooted, white, even or slightly larger at either end, tough, elastic, fibrous, with a central cylinder that is lightly stuffed or hollow; surface minutely tomentose except at base where it is decidedly hairy; the hairs white or a very light cream color.

Spores (of No. 1298) cream color, elliptic, 2.9-3.8 x 4.2-5 μ . Easily distinguished from *C. dryophila* (which is nearest) by the brick-colored stains.

131. Low dense woods, Glen Burnie Farm, October 4, 1908.

594. Along branch below Howell's Spring, October 18, 1912. Spores cream color, elliptic, smooth, 3-3.7 x 4.7 μ .

1298. On rotting pine log in woods south of athletic field, October 1, 1914. Photo.
 1884. Under pines near old iron mine, October 3, 1915.
 1939. In damp pine woods just south of athletic field, October 27, 1915. Spores smooth, subspherical, $3.6-4\mu$ thick.
 2370. Woods near Meeting of the Waters branch, June 5, 1916. Spores $3-4 \times 4.5-7\mu$.
 3011. Battle's Park just below Outdoor Theatre, April 19, 1918.
 3187. Under pines by branch toward Meeting of Waters, October 5, 1918.
 Asheville, on or around well decayed wood in mountain woods; rather rare. Beardslee.
 Middle district (Schw.), woods. Curtis.

2. *Collybia butyracea* Bull.

PLATES 5, 6, AND 23

Cap up to 6 cm. wide, convex, sometimes umbonate, smooth, shining, color pinkish-buff, darkest in center. Flesh 2.5 mm. thick at stem, very thin towards margin, soft.

Gills deeply depressed and angled at stem, nearly free, close, none forked, many short, up to 5.5 mm. wide near stem; white, margin strongly eroded.

Stem up to 6 cm. long, usually flattened and channelled, up to 5 mm. thick at cap, enlarging downward, smooth except near base which is incrassated with white mycelium, more or less obviously marked all over with longitudinal striations, color of cap, darkest below, flesh firm, elastic, fibro-cartilaginous, quite hollow.

Spores (of No. 1902) *not* white, exactly light buff of Ridgway, subpip-shaped, smooth, $3-3.7 \times 5-6 \mu$.

On earth in woods, rare. There is a greasy look to the cap, which gives the plant its name.

I cannot find any quality that will hold good between this and all the forms of *C. dryophila*. In Chapel Hill forms occur with greasy-looking caps and slender equal stems, and Beardslee's photo. of *C. dryophila* on earth shows the stem enlarged below just as in *C. butyracea*. Also the slender stemmed plants of *C. dryophila* often show the stem distinctly lined when a lens is used. The spores of the two species as we have distinguished them here are identical.

1902. In pine and oak woods near Brockwell's, Battle's Park, October 17, 1915.
 2431. Under shrubs in Mr. Woollen's yard, July 25, 1916. Spores elliptic, smooth, pointed at one end, $3-3.7 \times 5.5-7.4\mu$.

PLATE 5



COLLYBIA BUTYRACEA. No. 1902.

PLATE 6



COLLYBIA BUTYRACEA. Photo by B.

Asheville, rather rare. Beardslee.
Middle district, rotten trunks. Curtis.

3. *Collybia dryophila* Fr.

Collybia subdryophila Atk.

PLATES 7, 8, AND 23

Plants solitary, gregarious or caespitose with the enlarged bases densely crowded.

Cap about 2.5–5.3 cm. broad, convex then expanded and uneven, usually a little depressed in or around the center, smooth, hygrophanous; in damp weather translucent and greasy looking, in dry weather opaque and dull or faintly shining, not greasy; color pinkish-tan or dull yellowish-brown, the center darker or with a lighter "eye." Flesh thin, 1.5–2 mm. thick near center, soft, color of cap or whitish, taste and odor like rotten wood (fungoid), not farinaceous.

Gills very thin, nearly or quite free, crowded, sinuate, the edges uneven, pure white or in age faintly creamy or pinkish-creamy; when bruised turning slowly to ochraceous. Looking at gills when fresh the color of the pileus showing through in some forms gives the effect of wine color.

Stem 4–7.5 cm. long, 2–4 mm. thick, equal (typically) except for a sudden enlargement at the very base, but often varying towards the enlarged base of *C. butyracea*, damp, smooth, white-tomentose near base, and with several string-like rhizomorphs; color like that of cap or lighter, pithy then hollow. If examined with a lens the stem may be seen to be distinctly striate with inherent lines of color, especially below.

Spores (of No. 80) deep cream, elliptic, smooth, $3-3.7 \times 4.8-7 \mu$., most about $3.3 \times 5.5 \mu$.

I can find no character that will sharply separate this from *C. butyracea*, and plants combining the characters of the two are often found. I am satisfied that these supposed species are forms of only one.

This is the commonest and most variable of our *Collybias*. In old plants the pileus is often pale, and it presents many variations in size and habit. It is, however, soon learned and recognized in all its

* There is a peculiar growth that has been often found on the cap and stem surface in America (not in Europe) that was named by Peck *Tremella mycetophila*. It is in the form of rather small pale globules or cushions of various size, that are plicate and soft. They are not, however, a *Tremella* as the basidia are club-shaped as in an agaric. Burt now thinks it an abnormal growth of the *Collybia* itself, but Miss Hone thinks it a true parasite. See Mycological Notes No. 47, p. 662. 1917.

disguises. One photograph is of the caespitose form on old wood, but it should be noted that it is often solitary or gregarious.

Collybia subdryophila was described by Dr. Atkinson from plants sent him from Chapel Hill by us. It seems to me to be one of the numerous forms of this variable species. His description is as follows (Ann. Myc. 7: 367. 1909):

"Plants dry, 5-9 cm. high, pileus 2-3 cm. broad, stem 5 mm., stout. Pileus smooth, purplish or pinkish-brown. Gills white, adnexed. Spores oval to subglobose, granular, then usually with a small oil drop, 3-4 μ , in diameter, rarely 5 μ , long. Stem cartilaginous, tough, hollow, equal. Belongs to Levipedes section, resembles somewhat *C. dryophila*, but differs especially in the spores. C. U. herb., No. 22634, mixed woods on hillside by Fern Walk near Sparrow's Pond, Chapel Hill, N. C., W. C. Coker, October 2, 1908."

For good illustrations see Mycologia 3: 101, pl. 40, fig. 8, 1911, and 4: 164, pl. 68, fig. 3. 1912.

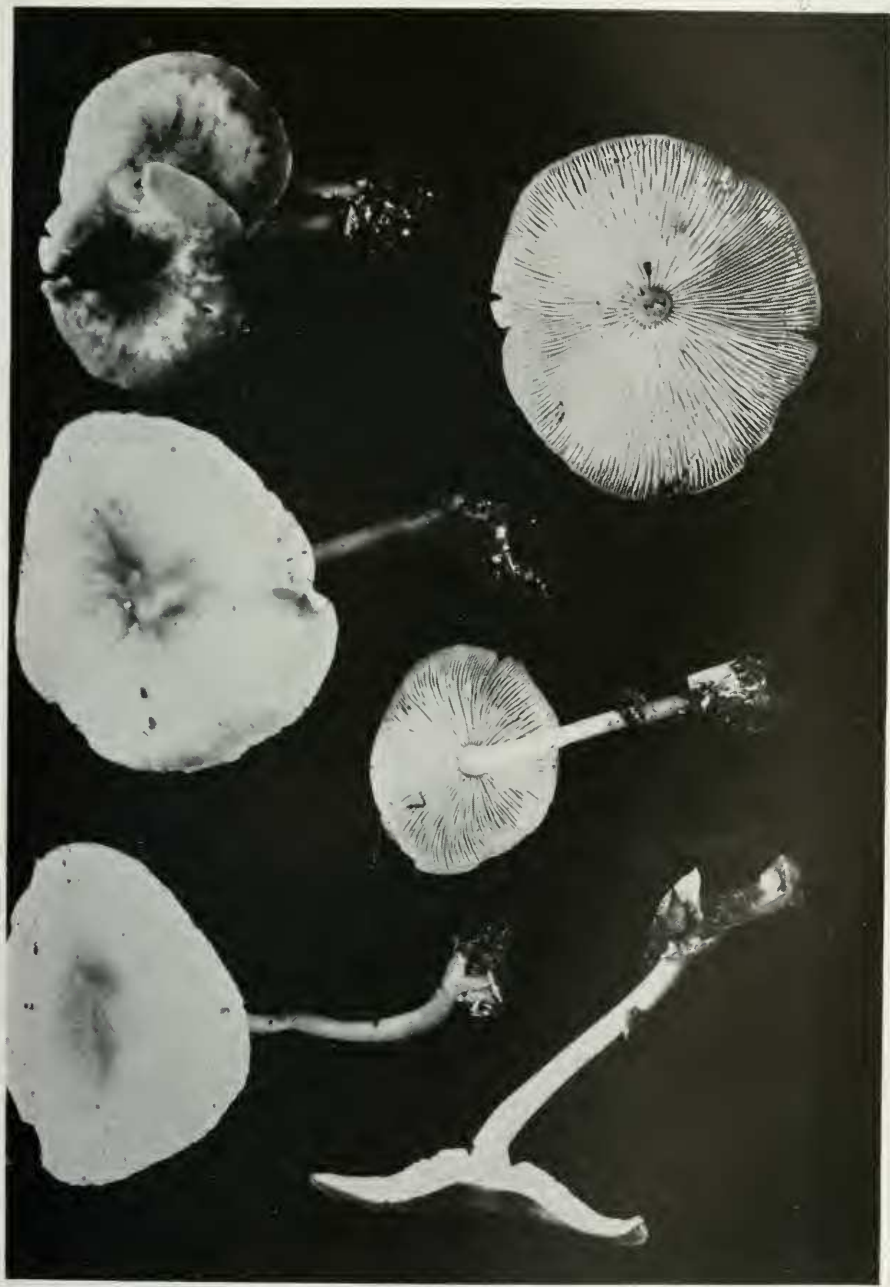
80. On side of hill east of Tenney's, October 23, 1911.
 1012. Among leaves in woods in Battle's Park, October 28, 1912. Spores cream color, 3.3-3.8 \times 5-7.5 μ .
 1745. On trunk of red maple among growth of Porella, at foot of Lone Pine Hill, September 12, 1915. A depauperate form. Spores about 3.7 \times 7 μ .
 2493. Gregarious to subcaespitose in humus, grove at "The Rocks," May 9, 1917. Photo. Intermediate in character between *C. butyracea* and *C. dryophila*. Spores white at first, 3-3.3 \times 5.5-6.7 μ , exactly like those of *C. butyracea* No. 1902.
 3049. Dense deciduous and also pine and deciduous woods, foot of Lone Pine Hill, May 18, 1918. Spores ovate-elliptic, white, smooth, 2.8-3.9 \times 5.2-6.5 μ .
 3066. Strowd's lowground woods, on decaying stump, May 22, 1918.
 3310. On a black gum log, June 7, 1919. One plant has on it a specimen of the growth called by Peck *Tremella mycocephala*. Painting.
 3542. Mixed woods, Battle's Park, October 28, 1919. Cap very pale buff, center slightly darker. Gills and top of stem pale yellow, darker buff below.
 Blowing Rock. Atkinson.
 Asheville, "In scattered colonies on old leaf mould and old wood. Often in dense clusters." Beardslee.
 Middle district, in woods. Curtis.

3a. *Collybia dryophila* Bull. A form.

We have a small, squat form of bare soil in shade that would hardly at first sight be referred to this species. It is single or caespitose;



COLLYBIA DRYOPHILA. Photo fly B.



the cap up to 2.5 cm., usually about 1.5 cm. broad, nearly plane or irregular, glabrous, not viscid, hygrophanous, brownish-leather color when wet, leather color or buffy leather when dry. Flesh concolorous; taste oily-woody, strong, odor same or slight. Gills rather close, sinuate, color of cap, 1-2 mm. wide. Stem 1.5-2.4 cm. long, 1-2 mm. thick, smooth, concolorous, tough, solid, firmly attached in the soil and bringing up a ball of earth. Spores (of No. 3237) white, elliptic, $2.9-3.7 \times 4.1-5.5 \mu$, identical with those of the typical form.

2500. In humus soil under shrubs in Arboretum, May 11, 1917.

3237. In sparse weeds and grass under oaks, roadside home near Mebane, N. C. May 20, 1919.

3236. Bare soil, road in front of Dr. Battle's, May 15, 1919. This is just like No. 3237, except that it is abnormally squat and irregular and more cespitose; cap margin strongly recurved in most; odor and taste the same.

3240. On nearly bare soil under oak, hillside on Glen Burnie farm, May 21, 1919. Spores $3 \times 4.2-5.5 \mu$.

4. *Collybia Earleae* (Murrill) n. comb.

Gymnopus Earleae Murrill.

PLATES 9 AND 23

Cap 6 mm. to 3.3 cm. broad, convex, then plane or concave, smooth, dull, margin incurved until near maturity, sometimes striate; color pinkish buff or dark brown then wood brown; surface minutely puberulent all over when young. Flesh concolorous, tough; taste rankly moldy; odor faintly similar.

Gills not crowded, notched at stem, narrowly adnexed, becoming practically free at full maturity, narrow, 1-3 mm. wide, pale then nearly color of cap, with tint of pink.

Stem 1.5-3.3 cm. long, 1-4 mm. thick, tough and cartilaginous, hollow, granular-pulverulent, then smooth, color of cap or a darker reddish buff; attached to soil by a decided clump of tangled, tawny hairs which come up with it, bringing a ball of earth.

Spores (of No. 3052) white, smooth, pip-shaped, $2.3-3 \times 5.2-6 \mu$.

This seems certainly *C. Earleae*, which is known only from the type locality—a creek bottom near Auburn, Alabama. The small size, dark color, growth on damp earth, pinkish-brown gills and particularly the dense clump of tawny hairs easily distinguish it.

3046. On damp ground, Strowd's lowground woods, May 5, 1918.
 3052. Same locality as No. 3046, May 7, 1918.
 3128. Same locality as No. 3046, May 18, 1918. Spores $3-3.8 \times 5.8-7\mu$.
 3130. Same locality as No. 3046, May 22, 1918.

5. *Collybia nummularia* Fr.

Collybia strictipes Pk.

PLATES 10 AND 23

This medium-sized plant grows generally in small tufts on rotting leaves in low woods. Cap up to 5.5 cm. broad, convex, then expanded, sometimes slightly depressed on one side, somewhat striate on margin, barely umbonate, yellowish-tan in color, often with tint of pink, the center almost brick red and usually a little rugose, often appearing water-soaked. The pileus sometimes shows concentric circles near the margin, evidently due to the plants being water soaked and drying in stages.

Gills close, and not very narrow, white or light flesh-colored, sinuate-attached, or sometimes free, not quite reaching the outer edge of the cap, many short ones.

Stem 3.5-7 cm. long, 3-7 mm. thick, cartilaginous, hollow, smooth, flesh-colored or whitish, darker at base, nearly equal, connected with extensive cream-colored mycelium that runs among the leaves.

Spores long, pip-shaped, white, smooth, $3.7 \times 7.4-8 \mu$, characteristically pointed and bent at the mucro end.

Peck says of *C. strictipes* (Rep. 49: 44. 1896): "From small unspotted forms of *C. maculata* this species may be distinguished by its even stem, less crowded lamellae and by the shape of its spores." From *C. dryophila* it is distinguished by the more yellowish cap with reddish, more or less rugose center, the more equal, paler, and more translucent stem, and by the longer, more pip-shaped spores. It is a common species and easily recognized. Kauffman has developed this species (as *C. strictipes*) from mycelium in leaf-mold brought into the laboratory and kept in a partially covered dish (Mich. Acad. Sci. Rept. 22: 203. 1920).

82. On leaves near Howell's Branch, October 4, 1911.
 83. Among leaves, Battle's Park, October 28, 1911.
 354. On rotting leaves near Howell's Branch, October 11, 1911. Spores pip-shaped, mostly pointed and slightly bent at one end, $4 \times 9\mu$.
 584. Near Howell's Branch, October 18, 1912. Spores $3.5-4.5 \times 6-9.5\mu$.



PLATE 9

COLLYBIA EARLEAE. No. 3128.

PLATE 10



COLLYBIA NUMMULARIA. No. 628.

589. On leaves, below Howell's Spring, October 18, 1912. Spores $3.3-4 \times 6-8.5\mu$, with mucro end pointed and bent.
628. On leaves near Battle's Branch back of Dr. Wilson's house, October 24, 1912.
Blowing Rock, Atkinson.
Asheville, abundant. Beardslee.

6. *Collybia myriadophylla* Peck.

Cap 2-5 cm. broad, thin and tough, broadly convex to plane and slightly depressed at the center, hygrophanous, brownish or grayish brown with a distinct lilac tinge when moist, paler when dry, minutely fibrillose.

Gills very crowded and narrow, adnexed, brownish lilac.

Stem slender, tough, 2-4 cm. long 1-2 mm. thick, colored like the cap, often compressed silky pruinose especially toward the rooting base.

Spores ellipsoid, $2 \times 3-4 \mu$.

Growing on old logs. Rare.

This seems more common farther to the north. It is quite common in the coniferous woods of upper Canada. It is very distinct in its very crowded and narrow lilac gills. The texture of the plant is suggestive of *Marasmius*.

Asheville. Beardslee.

7. *Collybia distorta* A. & S.

PLATE 11

Cap 2.6-8 cm. broad, campanulate, then expanded, and in age with the irregular and contorted margin upturned; glabrous, hygrophanous, deep reddish brown, paler when dry, not viscid. Flesh toughish, pale-concolorous; taste of rotten wood; odor none.

Gills crowded, up to 6 mm. wide, mostly narrower, several times branched toward the margin; edges pubescent, thick; color a dilute tan, then strongly stained and blotched with reddish brown.

Stem short in ours, 2-4 cm. long, 5-10 mm. thick, often flattened; strongly channelled, inherently fibrous, the base whitish with mycelium and connected with stout white strands which run in the rotten wood.

Spores white, smooth, oval, $3.3-4.2 \times 4.4-6 \mu$. (rather few in this collection).

3519. On a rotten log, October 26, 1919.

8. *Collybia radicata* Rehl.

PLATES 12 AND 23

Cap 3–10 cm. broad, expanded, usually umbonate and rugose, in center sometimes nearly plane; surface viscid, glabrous, varying from pale yellowish-brown or gray to deep blackish-brown, the margin lighter. Flesh thin, white, toughish, taste pleasant.

Gills white, rather distant, broad, adnexed to nearly free.

Stem very variable in length and thickness, often most slender when longest, 5–20 cm. long above ground, 3–13 mm. thick at stem, tapering upward, and extending deeply into the earth with a smaller root; surface glabrous or furfuraceous, striated and often grooved, about color of cap or lighter, darkest below; texture firm, stuffed.

Spores (of No. 1844) white, smooth, elliptic, $8-10.8 \times 14.4-19 \mu$.

A very variable plant both in size and color, but always easily recognized by the long rooting extension of the stem. It is common in open woods, groves and shrubby borders through the summer and fall, and is edible. McIlvaine says it is sweet, pleasing in texture and delicately flavored. For a good illustration see Krieger in Nat. Geog. Mag. 37: 398, 1920.

130. Campus in front of Alumni Building, September 21, 1908.

372. Open place west of athletic field, October 18, 1911.

472. Steep hillside on ground and on rotting tree roots in Battle's Park, September 30, 1912. Spores $11.8 \times 15.2 \mu$.

478. In open space back of South Building, October 2, 1912. Spores $11 \times 18.5 \mu$.

495. On steep hillside around rotting tree in Battle's Park, October 4, 1912.

1844. Battle's Park, north of Piney Prospect, September 20, 1915.

Asheville. Beardslee.

Blowing Rock. Atkinson.

Common in woods. Curtis.

9. *Collybia semitalis* Fr.

PLATES 14 AND 23

Cap convex, 2.5–5.5 cm. broad, convex except for a low umbo or nearly plane, hygrophanous, not viscid, rather silky-shining, inherently fibrous radially, at times minutely squamulose between center and margin, dark brown with a tawny tint, the center blackish and the margin soon so on withering or touching. Flesh 1.5 mm.

